UNVEILING OF MEMORIAL TABLET TO ALEXANDER GRAHAM BELL

A memorial tablet to the late Alexander Graham Bell, which has been erected by The Institution of Electrical Engineers at the left-hand side of the doorway to 16 South Charlotte Street, Edinburgh, was unveiled on the 24th November, 1937, by Sir George Lee, President of The Institution. The wording on the tablet is:

" ALEXANDER GRAHAM BELL,
Inventor of the Telephone,
Born here 3rd March 1847."

An extract from the register of births and baptisms for the parish of Edinburgh, relating to the birthplace of Alexander Graham Bell, is reproduced on page 224.

The proceedings at the unveiling, which were broadcast by the B.B.C. in the Regional programme, were presided over by Mr. E. Seddon, City Electrical Engineer, Edinburgh.

Sir George Lee (who read a message from 22 members of the Bell family living in the United States) said:—

" We are met here this morning to do honour to one of the sons of Edinburgh, Alexander Graham Bell, whose work and inventions have been of such lasting benefit to every country of the world. His most famous invention, the telephone, enables us in these days to maintain conversation with our intimate friends and relations all over the globe; and broadcasting, as well, is dependent upon the telephone as its primary means of transmission.

" Bell's work, however, covered many phases of humanitarian and scientific activities. His work, as a teacher to the deaf and dumb and in the development of correct methods of teaching, was one of the most consuming passions of his life, and many of these unfortunate people, still alive, bless the name of Bell for enabling them to speak. His interest in the work of voice production was the direct stimulus to his efforts to invent the telephone.

" Alexander Graham Bell was born in this house, 16 South Charlotte Street, Edinburgh, on the 3rd March, 1847. His grandfather, Alexander Bell, was a recognized authority on the teaching of speech, and his father, Melville Bell, was even more famous in the subject of speech production and was the inventor of a system, known as ' visible speech,' in which the symbols represented the various positions of the vocal organs. The reader had merely to arrange his lips, tongue, etc., in the positions indicated to produce the sound desired. The spoken language of the Chinese was the first foreign language to be translated into ' visible speech.'

" After the birth of Alexander Graham Bell the family moved to 13 Hope Street, and finally to 13 South Charlotte Street, where Bell lived as a boy. This was supplemented by a cottage at Trinity, then in the country, which provided an out-of-doors playground.

" At 10 years of age he went to a private school in Edinburgh, and later he attended Dr. Donaldson's class at the Royal High School. By his own account in later years he was lazy, but he could not have been very idle, seeing that he duly graduated at 14 years of age.

" It is, of course, somewhat difficult at this late date to verify all the movements of the Bell family in the various houses in Edinburgh, and I have therefore taken as my authority the very interesting work by his secretary, Catherine Mackenzie, who had access to all the family records which were available.

" On leaving school, he spent a year in London with his grandfather, who stimulated him effectively in reading and learning. His grandfather, he used to say, ' made him ashamed of his ignorance.' Here he became familiar with his grandfather's voice-teaching methods and practised elocution.

" Returning to Scotland he obtained a post at Mr. Skinner's school at Elgin, where he taught music and elocution. He made researches into the resonance of the mouth cavities and experimented with tuning-forks and electromagnets.

" In the meantime, his father, Melville Bell, was achieving fame in various directions and had become Professor of Elocution at the University of London. His system of ' visible speech ' attracted attention everywhere, and his methods of teaching elocution became the vogue of the time.

" At the height of this professional success, tragedy fell in the midst of the family. Two of Graham's brothers died of pulmonary disease and the only remaining son, Graham, showed signs of developing the same trouble. The father, without hesitation, sacrificed his professional career, and also the fame for which he had worked so tirelessly, and at 51 years of age he emigrated with his wife and son to a farm in Canada in order to enable the young man to recover his health in the open spaces of that country. They settled down at Brantford, Ontario, where the son very quickly recovered his health.

" The demands on the services of both father and son from New England for lectures and teaching brought Graham finally to Boston, where he taught at the School for the Deaf and also lectured on voice production.

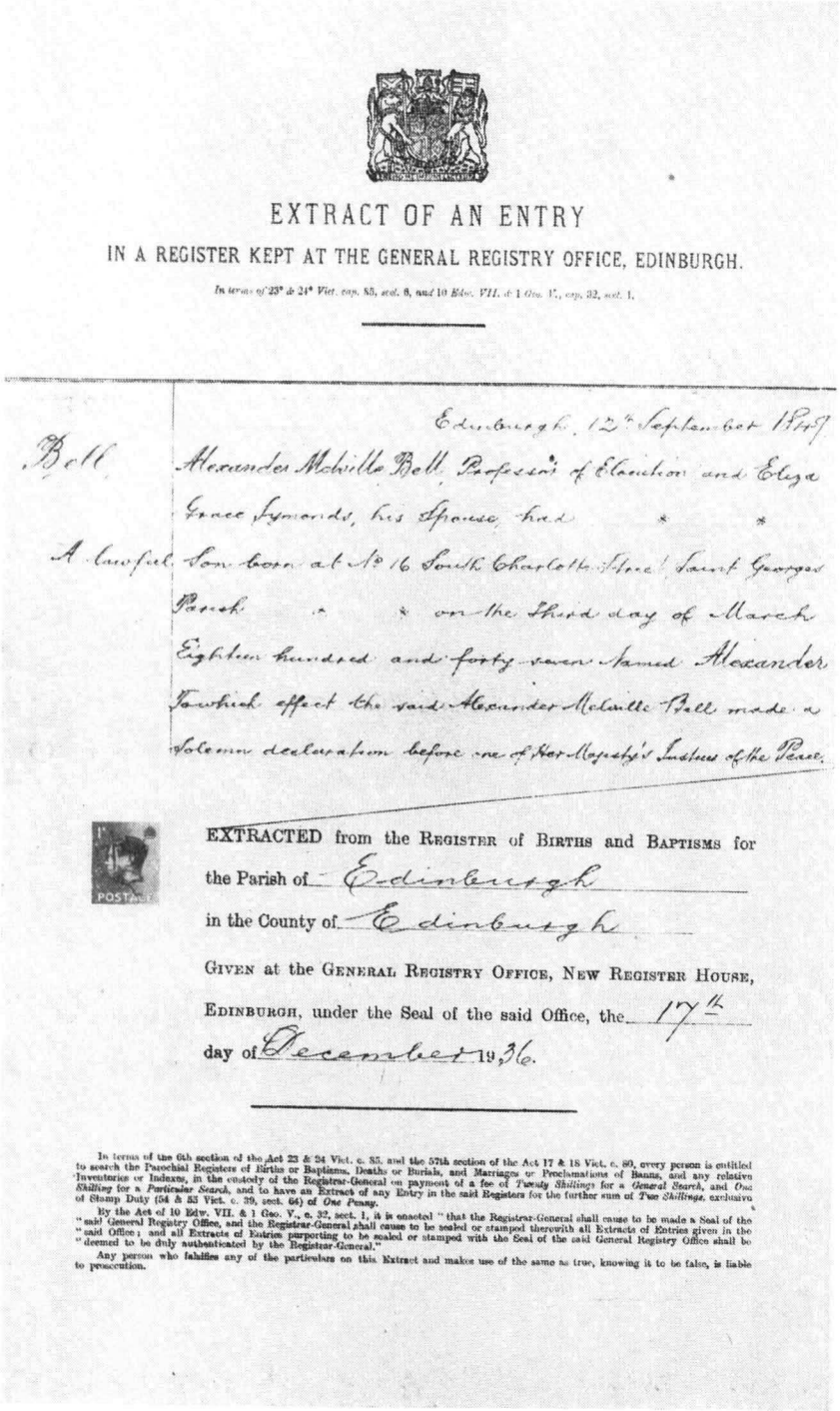
" Here he commenced his experiments to produce electric speech, and in June, 1875, he first succeeded in transmitting intelligible speech over a wire.

" The story of the telephone has been told in detail elsewhere. It is a story of long suffering, work, and effort, by Bell, in which his genius finally attained success. He set out to invent the telephone: it did not come by accident. There was no previous theory to guide him, and he was working all the time on the frontiers of knowledge. His indomitable efforts and clear thinking finally solved all the difficulties.

" Honours were late in coming to Bell, but when they did, from scientific institutions and universities in all the principal countries, they were showered upon him. In 1920, Bell revisited Scotland to see some of the old haunts of his youth, and in the autumn of that year the

Lord Provost of Edinburgh conferred the Freedom of the City upon him. Bell was very proud of this honour, and on the return journey to America, on landing at St. John, Bell, who was carrying the silver casket presented to him by the Lord Provost, was asked by the Customs Officer, 'What have you there, sir?', and replied 'The freedom of my native city, sir.'

"I now have the honour of unveiling this tablet on 16 South Charlotte Street, which has been erected by The Institution of Electrical Engineers to commemorate the birth of a famous son of Scotland in this house. May it serve to remind us that genius is a very precious gift to humanity, and that such genius as Bell's is one of the landmarks in the progress of civilization."



EXTRACT OF AN ENTRY

IN A REGISTER KEPT AT THE GENERAL REGISTRY OFFICE, EDINBURGH.

In terms of 23° & 24° Vict. cap. 85, sect. 6, and 10 Edw. VII. & 1 Geo. V., cap. 32, sect. 1.

Bell

Edinburgh, 12th September 1847

Alexander Melville Bell, Professor of Elocution and Eliza Grace Symonds, his Spouse, had * *

A lawful Son born at No 16 South Charlotte Street Saint Georges Parish * * on the Third day of March Eighteen hundred and forty seven Named Alexander Forwhich effect the said Alexander Melville Bell made a Solemn declaration before one of Her Majesty's Justices of the Peace.

EXTRACTED from the REGISTER of BIRTHS and BAPTISMS for the Parish of Edinburgh in the County of Edinburgh

GIVEN at the GENERAL REGISTRY OFFICE, NEW REGISTER HOUSE, EDINBURGH, under the Seal of the said Office, the 17th day of December 1936.

In terms of the 6th section of the Act 23 & 24 Vict. c. 85, and the 57th section of the Act 17 & 18 Vict. c. 80, every person is entitled to search the Parochial Registers of Births or Baptisms, Deaths or Burials, and Marriages or Proclamations of Banns, and any relative Inventories or Indexes, in the custody of the Registrar-General on payment of a fee of *Twenty Shillings* for a *General Search*, and *One Shilling* for a *Particular Search*, and to have an Extract of any Entry in the said Registers for the further sum of *Two Shillings*, exclusive of Stamp Duty (54 & 55 Vict. c. 39, sect. 64) of *One Penny*.

By the Act of 10 Edw. VII. & 1 Geo. V., c. 32, sect. 1, it is enacted "that the Registrar-General shall cause to be made a Seal of the "said General Registry Office, and the Registrar-General shall cause to be sealed or stamped therewith all Extracts of Entries given in the "said Office; and all Extracts of Entries purporting to be sealed or stamped with the Seal of the said General Registry Office shall be "deemed to be duly authenticated by the Registrar-General."

Any person who falsifies any of the particulars on this Extract and makes use of the same as true, knowing it to be false, is liable to prosecution.

After the unveiling a luncheon was given in the

Charlotte Rooms by Lieut.-Col. F. N. Westbury (*Scottish Regional Director to the Post Office*).

At the luncheon **Prof. G. W. O. Howe** said:—

"We have to-day conferred a threefold honour: we have honoured a man, a city, and science. We have honoured a man, a man who in his lifetime received many great honours but who, I feel sure, could he have known what we have done to-day in the city of his birth, would have counted it the greatest honour ever conferred upon him. We have honoured the City of Edinburgh by placing on record that it numbers among its sons the man whose name will for ever be associated with the invention of the telephone—a man whose name is written large across the American Continent, the land of his adoption, and borne by one of the greatest, if not the greatest, scientific research laboratories of the world—a man who has been made one of that band of immortals —Volta, Ampère, Watt, Ohm, Faraday, Henry, Joule, Maxwell—whose names are for ever enshrined in the nomenclature of science.

"As Dr. Ferguson said in a lecture before the Society of Arts in this city on the 14th January, 1878, 'While we do not grudge America the credit of the telephone, we recognize with pride that the inventor is a native of this city, and that his respected father was an active member of this Society.'

"And we have honoured science by our recognition of the greatness of the man and of his achievement. In this city are many monuments to those who have distinguished themselves in art and letters, in politics and war. We have to-day unveiled a monument to one who was distinguished in a branch of human activity in no way inferior to any of these—in applied science, in the conquest of the secrets and forces of nature and their application and development in the service of mankind.

"The tablet which has been unveiled to-day states that Alexander Graham Bell was the inventor of the telephone, and it may be asked whether this ascription is justified. Have not other men been given the credit for the invention? What justification have we for giving the credit to this son of Edinburgh? It was because these questions had been asked that I became more intimately associated with the memorial, and I feel it to be my duty to answer them. When the proposal came before The Institution of Electrical Engineers, the Secretary, knowing that divergent opinions had been expressed on the subject, showed a proper caution and asked me if I would look into the matter. He sent me a large number of books dealing with the early history of the telephone. I need only refer to one of these—a book written many years ago by the late Professor Silvanus Thompson and entitled 'Philipp Reis, the Inventor of the Telephone.' This book I read and re-read, and, strange to say, it removed any doubts which I may have had as to the justification for regarding Alexander Graham Bell as the inventor of the telephone. Philipp Reis was a German teacher living in the country near Frankfort-on-Main, who devoted years of patient research to the problem of telephony; he made several transmitters and receivers, and gave a demonstration before a Science Congress in 1864, but then apparently gave it up, for no further progress appears to have been made; the matter was allowed to drop, and Reis died in 1874. Professor Thompson visited his home and interviewed his widow and others who had known Reis and taken part in his experiments, but although he did everything possible to make out a case for Reis, I have no hesitation in saying that there is no reliable evidence that Reis ever succeeded in transmitting a single sentence of intelligible speech. His transmitter was a make-and-break apparatus, capable of transmitting tones and therefore tunes, and very simple vocal sounds. There is no doubt whatever that his object was to transmit speech. Twenty years after the demonstration, Professor Quincke said that he distinctly remembered having heard the words of the German poem 'Ach! du lieber Augustin, Alles ist hin!' but seeing that this is a well-known German song, the words would come automatically to the mind of any German on hearing the tune merely hummed. The strongest proof that the Reis telephone was incapable of transmitting intelligible speech was provided by the American experts who, in their efforts to prove that Reis anticipated Bell, obtained some Reis telephones from Germany and tried their utmost to make them work. In the controlled tests, out of a thousand words the listeners recognized 15, and 8 of these were wrong!

"Nor was Bell's invention in any way a development from Reis. The underlying principles were entirely different. Reis describes his apparatus very clearly, and in the light of our present knowledge—or even of the knowledge of the nature of speech which Bell possessed in 1875—it is obvious that such a make-and-break device could not possibly transmit intelligible speech. Bell's great conception was to transmit an undulating current varying in intensity in accordance with the complex movements of the air particles which constitute the sound wave. He was experimenting with multiple-tone telegraphy when a fortunate accident gave him a clue to the production of such a 'sound-shaped current.' What to many would have been merely an annoying occurrence was to Bell a blaze of light, and from that moment he had but one object in life. As he wrote to his parents in Canada 'Such a chimerical idea as telegraphing *vocal sounds* would indeed to *most minds* seem scarcely feasible enough to spend time working over. I believe, however, that it is feasible, and that I have got the cue to the solution of the problem.'

"Much confusion was caused by the indiscriminate use of the words 'telegraphy' and 'telephony.' The latter name had been applied since about 1841 to purely mechanical arrangements for transmitting sounds through wooden rods, and when applied to electrical methods referred merely to the transmission of sound and not necessarily to speech. For this reason Bell's invention was sometimes referred to as an 'articulate telephone,' but now this distinction is no longer necessary and when we say that Bell invented the telephone it is understood that we refer to an apparatus by means of which intelligible speech is transmitted by electrical methods. The great value of Bell's invention can be judged from the violence of the attacks made upon it, and its soundness from the failure of all the attacks. It was very fortunate that Bell was persuaded at the last moment to exhibit his telephone in its still imperfect form at the Centennial Exhibition in Philadelphia in 1876, and that one of the judges was Sir William Thomson, afterwards Lord

Kelvin. Kelvin's opinion helps us to form a correct estimate of the invention in the light of the most advanced knowledge of the time. Professor Hunt writing to Bell on the same evening says ' Sir William Thomson speaks with much enthusiasm of your achievement. What yesterday he would have declared impossible he has to-day seen realized, and he declares it the most wonderful thing he has seen in America. Your undulating current he declares a great and happy conception.' In his address to the British Association on his return he said —and it illustrates the mixed use of the words ' telephony ' and ' telegraphy '—' I saw and heard Elisha Gray's splendidly worked-out *electric telephone* actually sounding four messages simultaneously *on the Morse Code* . . . and I saw Edison's automatic telegraph delivering 1 015 words in 57 seconds; this done by the long-neglected electrochemical method of Bain. . . In the Canadian department I heard 'To be or not to be. . . there's the rub ' through an electric telegraph wire; but, scorning monosyllables, the electric articulation rose to higher flights, and gave me passages taken at random from the New York newspapers. . . All this my own ears heard. . . This, the greatest by far of all the marvels of the *electric telegraph*, is due to a young countryman of our own, Mr. Graham Bell. . . Who can but admire the hardihood of invention which devised such very slight means to realize the mathematical conception that, if electricity is to convey all the delicacies of quality which distinguish articulate speech, the strength of the current must vary continuously and as nearly as may be in simple proportion to the velocity of a particle of air engaged in constituting the sound?'

" I feel that Kelvin is with us here to-day in spirit, doing honour to his fellow countryman.

" There is a popular fallacy that I wish to correct and that is that Bell only invented the electromagnet telephone. He fully realized the possibility of producing the undulations in the current by means of a variable resistance, and he experimented with a transmitter in which a wire attached to the diaphragm dipped into a cup containing weak acid. His original patent contained a variable-resistance clause. Subsequent inventors devised improved methods of carrying out this conception.

" It has been suggested that Bell was not a scientist. In the paper previously referred to, read in 1878 before the Royal Scottish Society of Arts, Dr. Ferguson said ' Professor Graham Bell was in the first instance professionally non-scientific. One would almost fancy, if he had been specially scientific, educated caution would have warned him off from such an apparently unlikely and hopeless problem. To make the feeble voice of man speak to the uttermost ends of the earth as it no doubt yet will do, seemed beforehand a mere visionary project.' Now I want to dispel this myth. He had not been trained as a physicist or telegraph engineer, but he was a specialist in the science of speech and acoustics, and his dream of transmitting speech electrically had grown out of his expert knowledge of the voice, and the physical mechanism of speech. He was not, as Dr. Ferguson said, a Professor of English Literature but of Vocal Physiology in the Boston School of Oratory. The following quotations will, I think, show that he was an experienced experimental scientist and that, however deficient his electrical knowledge may have been in the initial stages, he had assimilated a considerable knowledge during the working out of his invention. In connection with teaching the deaf and dumb, he says ' For some time I carried on experiments with the manometric capsule of Koenig and with the phonautograph of Léon Scott. The scientific apparatus in the Institute of Technology in Boston was freely placed at my disposal for these experiments.' In a paper which he read before the Society of Telegraph Engineers in London on the 31st October, 1877, he said ' I saw no reason why the depression of a number of keys at the tuning-fork end of the circuit should not be followed by the audible production of a full chord from the piano in the distant city ' . . . ' I did not rest until I had obtained possession of a copy of Helmholtz's great work ' (Theory of Tone) . . . ' The interest which I felt in electricity led me to study the various systems of telegraphy in use in this country and in America.' More than a year before this, viz..on the 2nd July, 1876, Bell wrote the following letter:—

" ' In preparing for transmitting sounds to Philadelphia from here, I made such a startling discovery that I have been unable to do anything else since but experiment. In order to attempt the transmission of speech to Philadelphia, it was necessary to have a telephone constructed, the magnet of which should have a resistance equivalent to a considerable portion of the total resistance of the telegraph line between here and Philadelphia. The resistance of the line is over 5 000 ohms. Now I have had two magnets made the coils of which offer a resistance of 3 250 ohms both together. It would require a battery of many cells in order to operate a Morse sounder through such a resistance. It is as great a resistance as 325 miles of well-insulated telegraph wire. My discovery was that I could work my apparatus with *one cell of a battery* through this resistance. I am sure by substituting a *permanent magnet* for the pole of the electromagnet I could work it *without a battery at all.*

" ' With love and best wishes, Yours sincerely,
A. Graham Bell.'

" Here we see the birth of the permanent-magnet receiver, and we also see that Bell was fully alive to the necessity of matching the resistance of the terminal apparatus to that of the line. It is abundantly clear that his refusal to be ' warned off the apparently unlikely and hopeless problem ' was not due to any lack of scientific training or ignorance of electricity but to the ' enthusiasm and burning belief that was part of his genius and which animated all his work.'

" The secret of his great achievement is to be found in his character, and I am grateful for this opportunity of paying tribute to the memory of Alexander Graham Bell who was born here in Auld Reekie on the 3rd March, 1847, and passed away, as was most fitting, in Nova Scotia on the 2nd August, 1922."

Mr. F. Gill (*Past-President*), Dr. L. F. Morehouse (representing the American Telegraph and Telephone Co.), Mr. J. E. Kingsbury, Mr. F. G. C. Baldwin, Mr. J. J. McKichan, and Bailie E. Walker, J.P., also spoke.